Force and Newton's Law's

Book Chapter: 4
Book Pages: pp82-104
Practice Problems: pp 106-114; 8, 16, 28, 44, 64

Terms/ Ideas:
'The Principia'
Force
Inertia
Weight
Frame of reference
Friction
Coefficient of friction
Free Body Diagram
Time dilation, length contraction and mass increase.
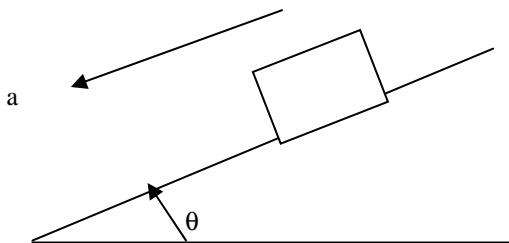

Equations:
$v = v_o + at$
$d = v_o t + 1/2at^2$
$v^2 - v_o^2 = 2ad$
$a=g$ in free-fall
$f = ma$
$f_f = \mu N$

Free Response:

A wooden board is raised at one end until an angle of 30.0 ° is achieved. A 2.0 Kg box is placed on the incline 1.0 meter from the lower end and given a slight push to overcome static friction. The coefficient of friction is .20 between the box and board.

a) Draw a free body diagram for the box.

b) Determine the rate of acceleration of the box down the incline.

c) Determine the speed of the box at the bottom of the incline.

d) If the box in the above problem were allowed to sit on the incline without sliding, what would the minimum coefficient of friction need to be to stop the box from sliding down the incline, no push is supplied.